Determining passenger satisfaction out of platform-based amenities: A study of Kanpur Central Railway Station

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A B S T R A C T

Platforms constitute an integral component of any rail journey. An individual may avail of several platform-based amenities at a railway station, satisfaction out of which is assumed to be of paramount significance. Hence this study measures satisfaction that passengers gain out of such amenities through a survey conducted at Kanpur Central station of North Central Railway in India. Regression analysis has been applied to determine a model of passenger satisfaction, following which, a service quality performance matrix (SQPM) is constructed to demarcate between amenities that need to be improved and those that may be maintained. Finally a User Satisfaction Index (USI) is built based on Customer Satisfaction Index to define a priority order for improving amenities. Regression results show 5 out of 7 factors significant in predicting passenger satisfaction. Out of the 26 amenities under *improvement* zone of SQPM, the top 5 that need to be improved as per USI include 3 related to cleanliness and hygiene. Findings point towards abysmal condition of Kanpur Central, which falls in the prestigious A1 category of stations of Indian Railways. The validated model as an outcome of this paper is expected to be useful for policy makers in defining policies and strategies for improving platform-based amenities. Further, the CSI we have constructed would provide a framework to formulate improvement action plans on priority basis by Indian Railways.

1. Introduction

Considered as the most important determinant of both consumer behaviour and customer loyalty (Olsen, 2007), customer satisfaction is influenced by the quality of service delivery (Kilibarda et al., 2015). **Any initiative to increase customer satisfaction begins with evaluating service quality (**Aydin et al., 2017**).** Hence it is imperative for service organizations to identify specific service quality requirements (de Oña et al., 2016), thereby fulfilling customers' expectations by providing quality services (Parasuraman et al., 1988; Kilibarda et al., 2015). At the same time, delivering basic expected service quality is not enough, as in case of service industries, innovation is regarded as a strong driver not only of customer satisfaction, but also of firm performance (Sundbo, 1997; Gallouj and Weinstein, 1997; Kandampully, 2002 cited from Bellingkrodt and Wallenburg, 2015). Service organizations therefore consistently try to improve and innovate their service delivery process in order to satisfy their customers and gain their loyalty.

Management of public transport quality has evolved as a subject of extensive research in recent years (Becker and Albers, 2016).

Profitability of any public transport system depends on the level of service delivery, while the quality of service provided therein is reflective of a passenger's perception and expectations of transit performance (TCRP, 2000; Machado-Leon et al., 2017). **Assessing a transportation system towards improvement of its efficiency service quality as well as customer satisfaction is of considerable importance (**Mardani et al., 2016**).** Public transport operators can enhance usage of their services by improving perception of passengers about the quality of services delivered (Guirao et al., 2016).

Incentives for using public transport go a long way in enhancing sustainable travel behaviour and thereby lead to increased satisfaction among passengers (Abou-Zeid and Fujii, 2016). Level of satisfaction of public transit customers has significant impact on their decision of whether or not to choose it as their primary mode of commuting (TriMet, 1995). Aydin et al. (2017) **posit that ensuring high level of customer satisfaction is an important task for both managers and authorities of public transport systems.** Eboli and Mazzulla (2009a,b) have established that a customer who derives good experience with transit performance is likely to use such transit services again. This is because of

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the underlying assumption that the actual service is directly linked with a customer's perception of the service (Friman and Fellesson, 2009). This pushes transit operators to survey their customers on a continuous basis so as to understand the areas that lead to rider satisfaction (Verbich and Ei-Geneidy, 2016).

Development and management of transportation systems is deemed vital for both economic and social development of any country (Mardani et al., 2016**).** Especially rail transport has played a prominent role in establishing economic vitality of urban areas (Shen et al., 2016) and is the most preferred among public transportation services (Celik et al., 2014; Aydin, 2017). The same holds true in case of India; railway is the primary mode of transportation for majority of India's population because of its extended network and affordability (Geetika and Nandan, 2010). With over 66,030 of route kilometers, 90, 803 km of running tracks, around 7137 stations, 10,773 locomotives, 11, 000 trains running every day and over 1.32 million workforce (as on 31st March 2015), Indian Railways (hereafter also referred to as IR or Railways) is the largest rail network in Asia and the third largest in the world (www.indianrailway.gov.in). Having the tagline 'Lifeline to the nation', Indian Railways is an engine for socio-economic development of India (Sharma et al., 2016), and it proves its worth by providing millions of passengers a convenient, accessible and affordable medium to travel every day across the length and breadth of the country (Geetika and Nandan, 2010).

Platforms constitute an integral component of any rail journey. Be it while travelling by train, or when seeing off/receiving any passenger, an individual may avail of several platform-based amenities at a station, including refreshment stalls, ATMs, washrooms, cloak rooms and waiting halls. **Given that customer satisfaction surveys have come up as a significant tool for planners and policy makers in public transportation systems (**Guirao et al., 2016**),** this research paper focuses on measuring satisfaction of passengers with such platform-based amenities by considering the Kanpur Central Railway Station of North Central Railway (NCR) in India, and determining a model for passenger satisfaction. A service quality performance matrix (SQPM) has been constructed using the amenities clubbed under factors significant for satisfaction. Finally a user satisfaction index (USI) is drawn in line with the customer satisfaction index designed by previous researchers (Yang, 2003; Giannoccaro et al., 2008) to determine a priority order of amenities to be improved.

The subject matter of this paper finds special relevance in light of the decision taken by Ministry of Railways, Government of India to develop railway stations to world-class standards. Initially in 2006 the Ministry had selected nineteen stations for this purpose (Railway Board, 2006), and had further extended the list to fifty in 2010, including thirty one more stations across the seventeen zones of Indian Railways (Railway Board, 2010). Guidelines on which the selected stations are to be developed and facilities that need to be mandatorily provided therein have also been set out (Railway Board, 2006, 2009a, b and 2010). The Ministry even constituted an expert group for analyzing the various options available to strengthen its rail network and to suggest necessary recommendations for its modernization (Railway Board, 2009a, b). These guidelines offer an opportunity to conduct a preliminary investigation in order to assess their comprehensiveness and the extent to which they are being followed.

The next section presents review of existing literature on satisfaction out of **public transportation services; distinct sub-sections have been dedicated to bus transportation, airport terminals and railway stations, including transit rail services**, with special focus on amenities available at platforms. **Citations from extant literature on service quality performance matrix and its application across industries as one of the tools of data analysis used in this paper has also been presented in a separate sub-section.** This is followed by the research methodology we have adopted, data analysis and discussion. Conclusions and recommendations are highlighted thereafter, and the paper ends with limitations of the study and avenues for further research.

2. Literature review

Review of extant literature is a prerequisite for any sound research. **Context of mobility in developing countries, argue** Machado-Leon et al. (2017)**, is different from developed ones.** Following this, we argue that satisfaction gained by passengers from platform-based amenities may not be an area of concern for developed nations as much it is for a country like India. This section features a summary of past research on satisfaction derived by passengers out of various modes of public transport, including railways and platforms of railway stations, conducted in India as well as other countries.

2.1. Studies on satisfaction with public transport

Guirao et al. (2016) **have developed a survey technique that is based on multiple regression analysis, factorial analysis and Multiple Indicators Multiple Causes (MIMIC) models to estimate importance of quality attributes in public transportation systems.** Friman and Fellesson (2009) have analyzed the association between objective measures of service performance in public transport and perceived satisfaction of travelers in Europe. Satisfaction from service performance was concluded to be far from perfect and significant positive relation was seen between average transportation speed and passenger satisfaction. Dell'Olio et al. (2011) **have enlisted cleanliness, comfort and waiting time as the highest valued public transport criteria by passengers, while journey time, waiting time and level of occupancy were rated the most important by potential passengers.** Mardani et al. (2016) **have provided a review of Multiple Criteria Decision Making (MCDM) techniques for decision making as applied to evaluate transportation systems.** De Vos et al. (2016), in their research on urban and suburban neighbourhoods in the city of Ghent, Belgium, have concluded that transit users hold a negative perception towards public transit services, while active travel leads to greater level of satisfaction. Machado-Leon et al. (2017) **have applied the Importance-Performance Analysis technique in combination with a decision tree model for assessing the quality of metro, tramway, and commuter rail services in Algiers on the basis of responses of a customer satisfaction survey.**

Waiting time and travel time influence whether passengers derive satisfaction out of transport services. Among all parameters studied by Cervero (1990), schedule reliability was the most important for transit passengers. Safety & security is another important dimension that has been taken into account by various researchers (e.g., TriMet, 1995; Andreassen, 1995).

Scheduled timetables, announcement systems (Andreassen, 1995) and accessibility (Daganzo, 2010; Owen and Levinson, 2014; MTA, 2014; Tong et al., 2015) also have positive relationship with satisfaction perceived by passengers. Other parameters satisfying passengers that are available in public transport research include cleanliness (e.g., TriMet, 1995; Eboli and Mazzulla, 2009a, b; MTA, 2014), crowdedness (e.g., Haywood and Koning, 2015) and comfort (e.g., TriMet, 1995; MTA, 2014).

Discriminant function analysis (stepwise method) of sixteen service features of public transport in the city of Munich by Le-Klahn et al. (2014) has led to six aspects (information, ticket price, service frequency, space inside vehicle, cleanliness of vehicle and ease of use) that were the most important for defining visitor satisfaction. Results of three statistically significant MANOVA models proposed by Currie et al. (2013) in context of public transport in Melbourne, Australia reveal that psychological influences like "feeling comfortable with strangers on public transport" have the highest level of individual influence on perception of safety. In an assessment of stress level caused by commuting in Dublin city, Cantwell et al. (2009) have concluded that satisfaction level among public transport users decreases for commuters who travel by crowded or unreliable services and for those who have long waiting time. Findings of a multinomial logit model showed that utility derived by commuters